Jolt Session: Net Zero Overhead (NZO)

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Data Center Energy Use

Jonathan Koomey. 2011. *Growth in data center electricity use 2005 to 2010.* Oakland, CA: Analytics Press. July. <http://www.analyticspress.com/datacenters.html>

U.S. data center energy use: 67 – 85 TWh (1.2 – 1.5% of US production)

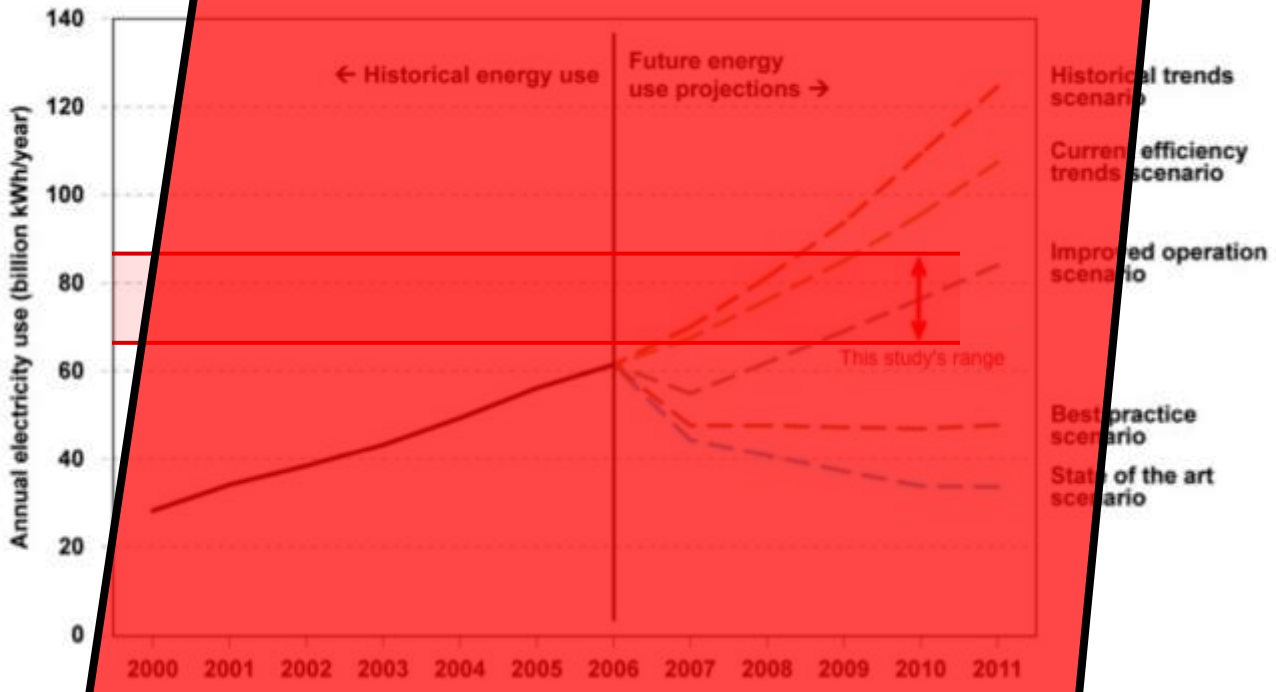


Figure ES-1: Predicted US electricity use for data centers from the EPA report to Congress (EPA 2007) and the range estimated in this study

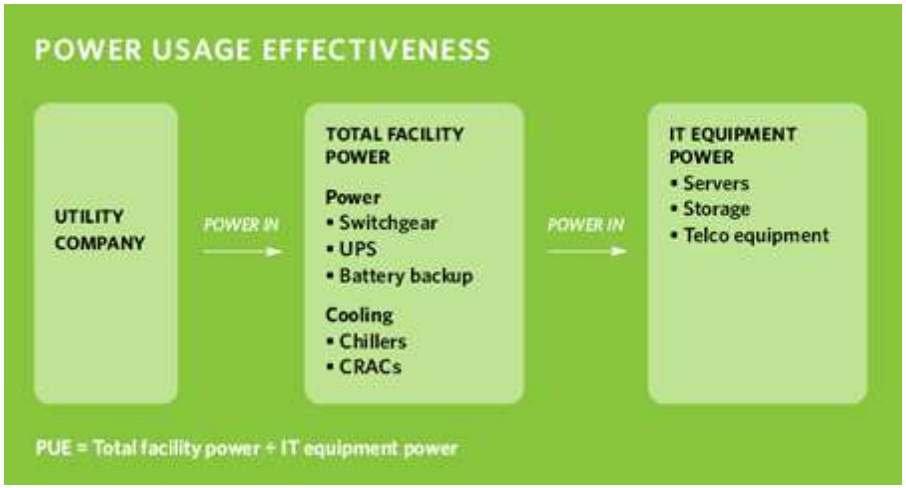
Net Zero Energy Lightbulb?

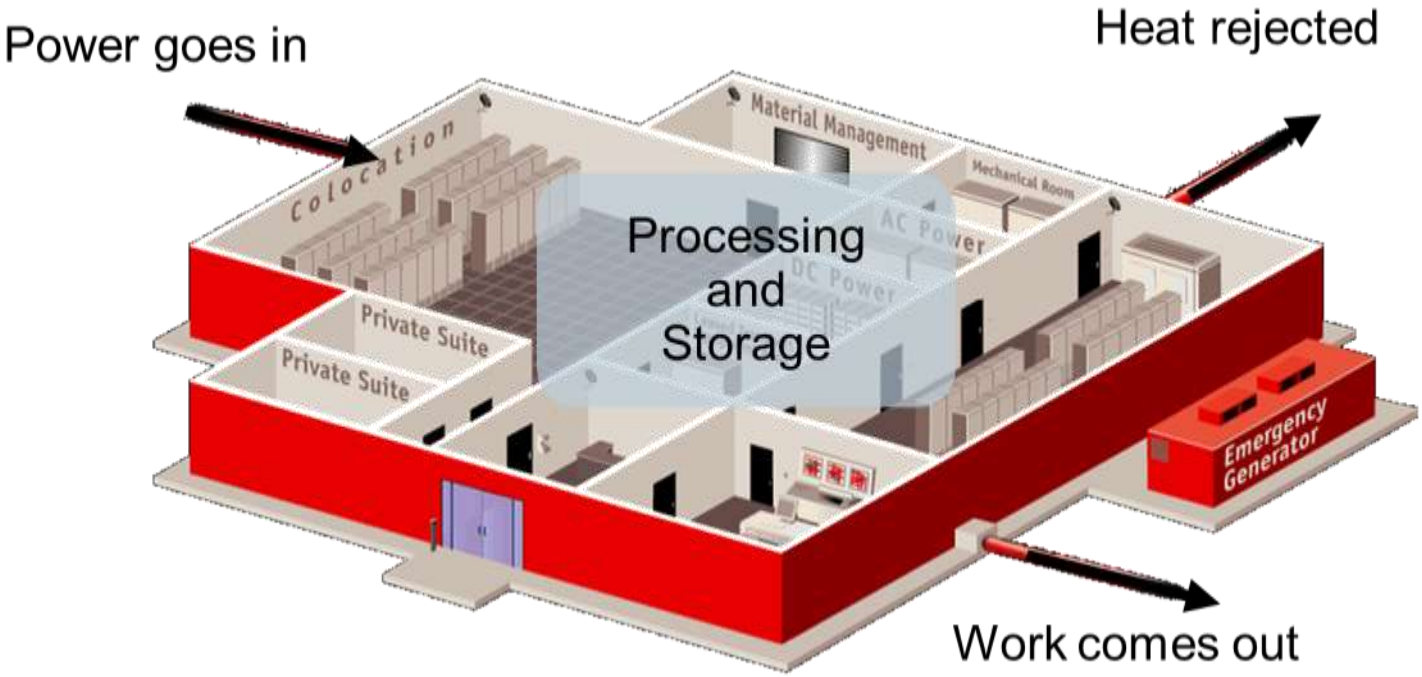
Power Usage Effectiveness (PUE)

$$PUE = \frac{\text{Total Facility Energy}}{\text{Total IT Energy}}$$

OR

$$PUE = \frac{\text{Overhead + IT Energy}}{\text{IT Energy}}$$



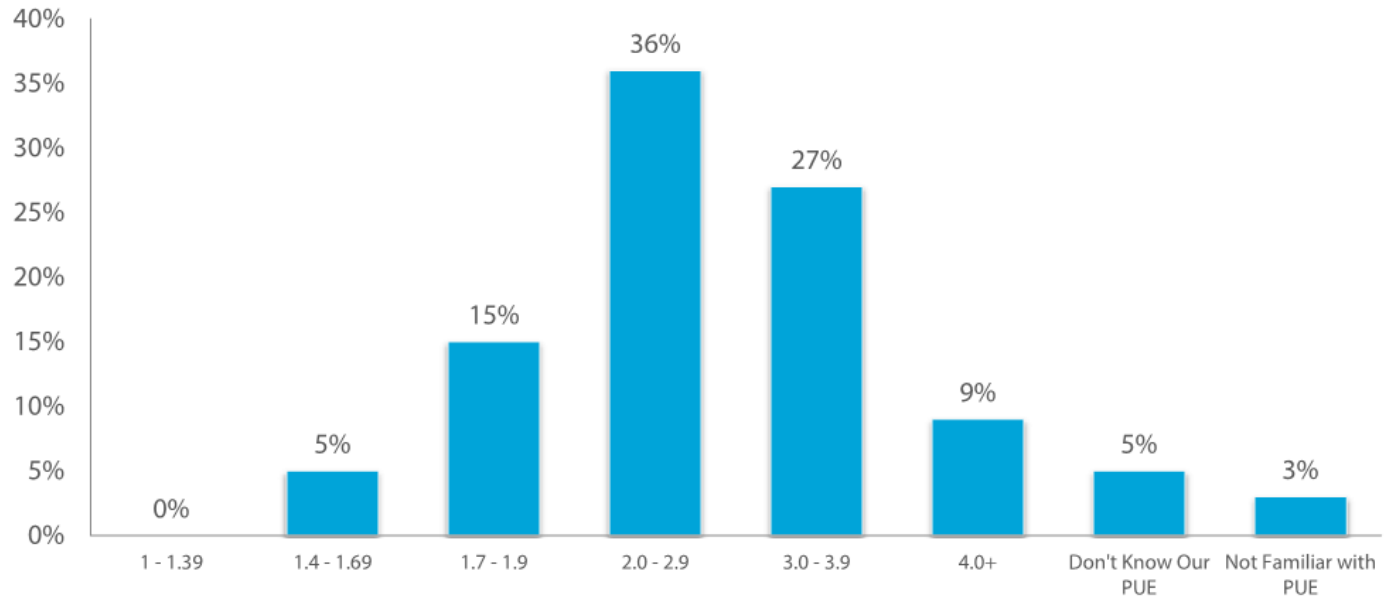


Typical PUE values – April 2013 Survey

Power Usage Effectiveness

RESPONDENTS WERE ASKED ABOUT THE AVERAGE POWER USAGE EFFECTIVENESS (PUE) OF THEIR DATA CENTERS.

- 5% don't know their PUE and 3% are unfamiliar with PUE.
- 20% report a PUE of less than 2.0.
- The average reported PUE is 2.9.



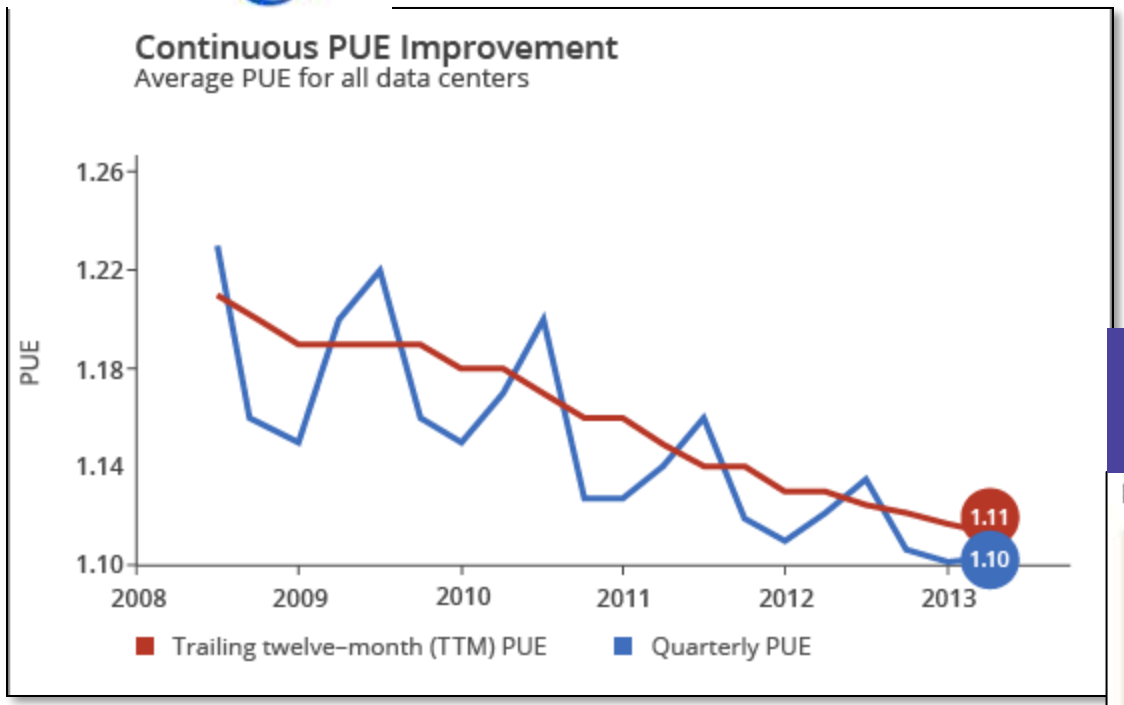
Base = Total (N=300)

18

DIGITAL REALTY

Best PUE In The Industry

Google



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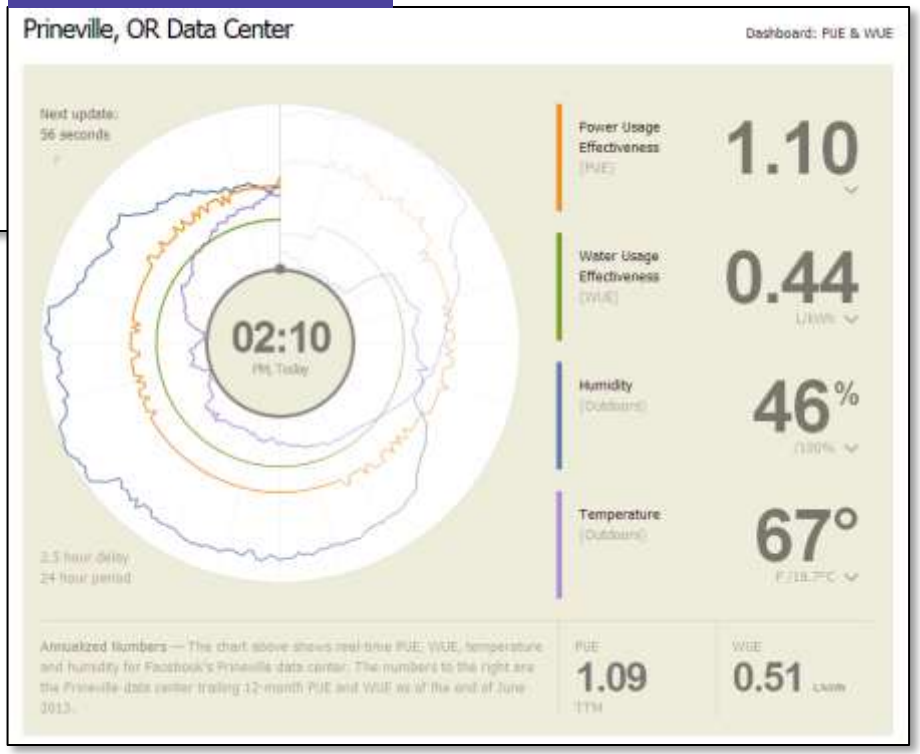
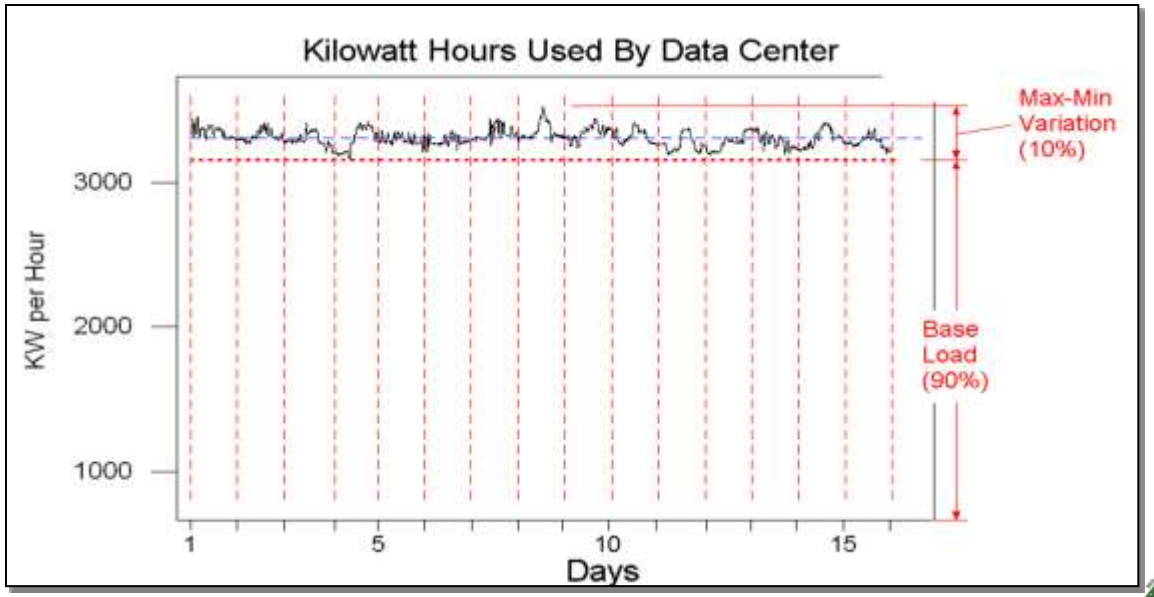
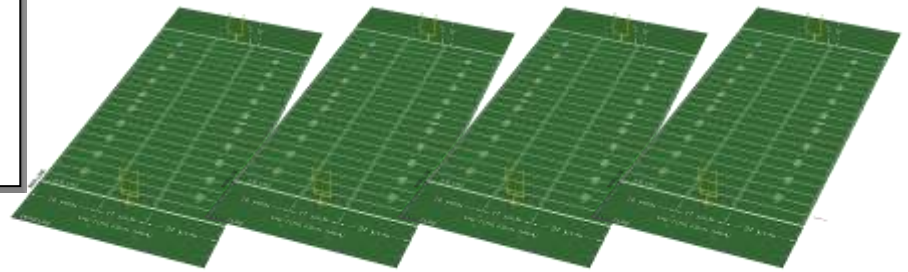


Solar Powered Data Centers Impractical



Dublin data center, Jan 1-15, 2007



3,400kW x 8,760 hr/yr = 29.8M kWh / yr

Boulder Capacity Factor ~ 0.167 Wh / yr / W_p

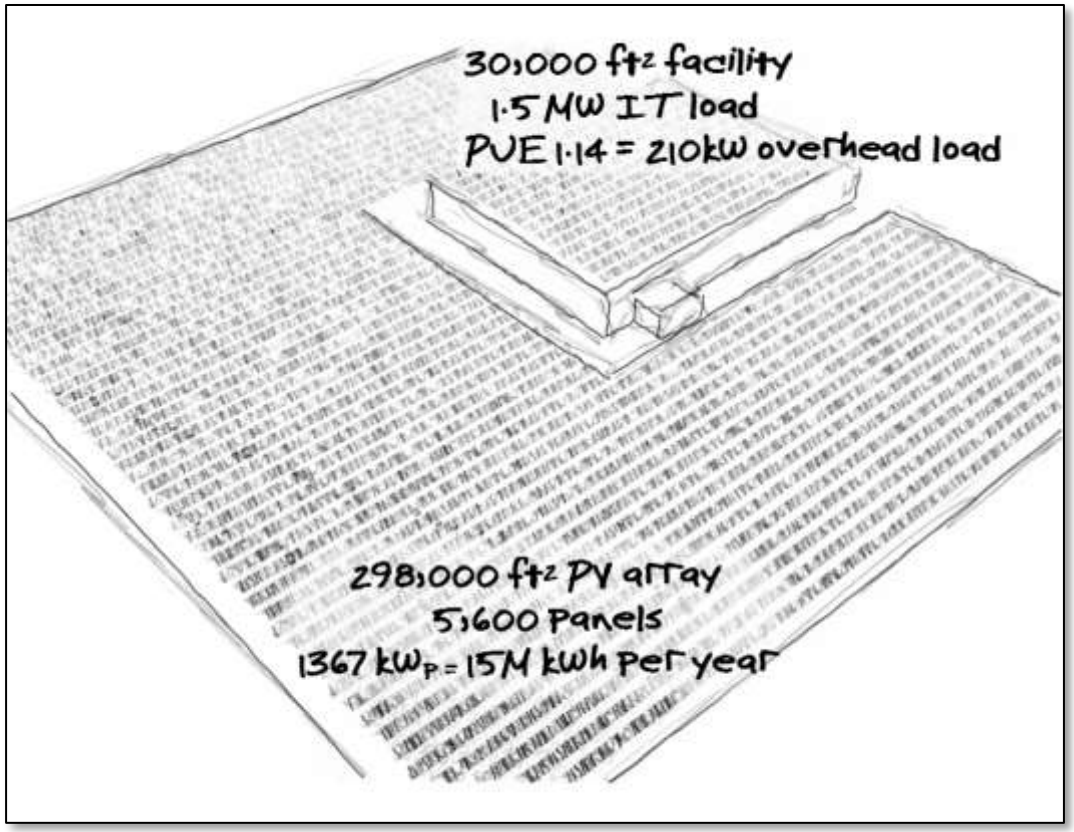
4.08 MW_p PV needed; 20 Acres, $8M - $13M

Net Zero Overhead

Overhead is PUE “1 point ANYTHING”

Make data center as efficient as possible

Then offset the overhead with renewables:



http://www.datacenterdynamics.com/blogs/mark-monroe/net-zero-overhead-data-centers

Things to think about:

1) Does the achievement of Net Zero motivate?
2) Is it still impractical in a capital intensive project?
3) Would 3rd party leasing arrangements work?
4) Would other renewables be usable?
5) Is there an even more practical interim goal?

Thank you!